Journal of the Society of Arts.

FRIDAY, NOVEMBER 26, 1869.

Announcements by the Council.

ORDINARY MEETINGS.

Wednesday Evenings at eight o'clock :—

DECEMBER 1.—"On an Improved Means for Laying a Tunnel for the Transit of Passengers across the Channel." By ZERAH COLBURN, Esq., C.E. On this evening Captain Tyler, R.E., will preside.

DECEMBER 8.—"On Prints and their Production." Being a sequel to a former paper, entitled "Engraving and other Reproductive Art Processes." By S. T. DAVENPORT, Esq.

DECEMBER 15.—"On India-rubber, its History, Commerce, and Supply." By J. COLLINS, Esq.

DECEMBER 22.—"On the Recent Improvements in Small Arms, British and Foreign." By Capt. O'HEA.

CANTOR LECTURES.

The first course of Cantor Lectures for the present Session will be "On the Spectroscope and its Applications," by J. NORMAN LOCKYER, Esq., F.R.S., and will consist of three Lectures, to be delivered on Monday Evenings, the 6th, 13th, and 20th December, at Eight o'clock.

These Lectures are open to Members, each of whom has the privilege of introducing two Friends to each Lecture. Tickets for this purpose have been forwarded to each Member.

INDIA COMMITTEE.

At a meeting of the Committee, held on Thursday, Nov. 11th, it was resolved that the Council be recommended to memorialise the Secretary of State for India to take measures that the visit to this country of Niaz Mahomed, a native of Yarkand, may be made useful for the promotion of our commercial interests in High Asia.

The Conferences on subjects relating to India will be resumed this evening (Friday), the 26th instant, when a paper on "Irrigation," by T. Login, Esq., C.E., will be read and discussed. The chair will be taken at 8 o'clock by Lieut.-General Sir Arthur Cotton.

The Council, on the recommendation of the Committee, offers the silver medal of the Society for the best treatise on the profitable production of tea. Competing treatises must be sent in to the Secretary of the Society of Arts, on or before June 1st, 1870. Each treatise must bear a distinguishing motto, and be accompanied by a sealed envelope, containing the name and address of the writer, with a corresponding motto on the outside.

The following suggestions have been drawn up by the Committee, for the guidance of intending competitors :—

1. The medal is offered in consequence of the conflicting opinions expressed on the subject by practical men in England, as shown by the reports of the two conferences on tea cultivation, held by the Society.

2. The treatise to be on—"The profitable Production of Tea in India, from the First Purchasing or Renting of the Land to the Arrival of the Tea in the London Market," with especial reference to the following points :—

The cost, *i.e.*, the price or rent, of land, and its judicious selection as to soil and climate.

The best method of raising and planting out tea plants, and the effect of the use of manure.

The relative advantages of planting in the "shade" or the "open."

The use of mechanical inventions and contrivances, as tending to reduce the cost of production and manufacture, more especially in leaf-rolling; the application of steam or hot air to the roasting or drying processes with a view to economy in fuel; and machinery to simplify and cheapen the manufacture of tea-boxes.

The manufacture of brick tea, such as will find a profitable sale in Central Asia, and successfully compete with that from China.

The utilisation of tea seed in the arts and manufactures, or in feeding cattle.

The rolling and sifting of tea.

The condition of the supply of labour.

The size of tea packages.

The cost of cultivation in full detail.

The cost of manufacture in full detail.

The nature and cost of transit in full detail; first to sea-port; second to London.

The chemistry of tea manufacture.

The causes of "sour" tea, and how they may be avoided.

The causes of past failures.

3. The attention of writers is especially called to the treatises of Ball, Fortune, Bruce, and Morice.

MECHANICAL COMMITTEE.

The Council have appointed a Committee to consider and discuss questions, relating to mechanical inventions, which may appear to be of too technical a character to be brought before the Society at the Wednesday evening meetings.

DONATIONS TO THE LIBRARY.

The following works have recently been presented to the Library, and the thanks of the Council have been communicated to the donors :—

The Complete Concordance to Shakspeare, by Mary Cowden Clarke; presented by M. Mason.

Catalogue of the Library of the South Australian Institute; presented by the Institute.

Memoir of the late Henry Booth, by Robert Smiles; presented by Miss Booth.

Guide to Sericiculture, by Thomas Dickins, President of the Silk Supply Association, with the Report on the Silk Districts of Japan, by F. O. Adams; presented by Thomas Dickins.

SUBSCRIPTIONS.

The Michaelmas subscriptions are due, and should be forwarded by cheque or Post-office order, crossed "Coutts and Co.," and made payable to Mr. Samuel Thomas Davenport, Financial Officer.

Proceedings of the Society.

SECOND ORDINARY MEETING.

Wednesday, 24th November, 1869; FRANCIS BENNOCH, Esq., in the chair.

The following candidates were proposed for election as members of the Society:—

Beamish, William, 5, Elgin-road, St. Peter's-park, Paddington, W.
Berthon, Charles Septimus, 20, Margaret-street, Cavendish-square, W.
Dashwood, Captain F. L., 6, Park-street, Westminster, S.W.
Foord, John Ross, Mayor of Rochester.
Lesingham, Henry, Victoria College, Bayswater, W.
Ludlam, Thomas Edward, Marlborough Lodge, Brentford-end, Isleworth, W.
Thomson, Robert, L.D.S., Denmark-hill, Camberwell, S.W.

The Paper read was—

ON SILK SUPPLY,

By THOMAS DICKINS, Esq., Chairman of the Silk Supply Association.

Fourteen years since, I had the honour of addressing an audience in this room, on the subject of the "Silkworm and its Products."* I then endeavoured to make my paper interesting, by a description of the nature, habits, and unrivalled properties of that wonderful insect. The silk trade was at that time comparatively prosperous, and the present scarcity and high prices of its raw material were contemplated by no one. Unhappily, since that period, very disastrous times have come upon us, and have brought with them such a combination of crushing misfortunes as to cause a partial paralysis of our silk industry. Many of the most eminent manufacturers have closed their mills and abandoned their trade; thousands of weavers have been thrown out of their accustomed employment, and compelled to labour at other work, for which they were often most unfitted; and a melancholy feeling of depression has affected all concerned.

I propose to consider some of the causes of these calamities, and to show that it is possible, not only for the silk trade to emancipate itself from present difficulties, but that it may so resuscitate its prosperity as to anticipate a very satisfactory future.

The silk manufacture of this country, from its earliest introduction, has been, and not without abundant reason, jealous and afraid of foreign competition, always seeking from our government protection in one form or another—always relying on adventitious support, instead of trusting to its own strength. At one time, bounties were granted on silk goods exported; at another, foreign silks were prohibited, and wages were regulated by Act of Parliament. Such enactments having been found to operate disadvantageously, they were repealed, and heavy duties imposed upon the importation of foreign manufactures. Those duties were gradually reduced to about 10 per cent., at which rate they existed when the French Treaty was entered into. That treaty admits into this country, free of duty, fabrics made wholly or partly of silk; but France admits duty-free only certain descriptions of silk goods. All other silk fabrics are subject to duties; and mixed goods, that is, fabrics partly of silk, pay a duty averaging about 10 per cent.

During these periods of prohibition and excessive protection, our silk manufacture was, in degree of excellence, so much below the Continental standard, that foreign silks were smuggled at great cost and risk. The ladies, who are always entitled to have the best, and certainly the most beautiful things they can get, would have them at any price, because of their superior beauty. Indeed a smuggled silk dress was the more appreciated because of its contraband character.

With relaxed duties, and a fairer competition, our manufacturers were stimulated to improvement, and, for some years prior to the treaty, the trade was not unremunerative. It had in one respect, unfortunately, attained such a degree of confidence and prosperity, that a large number of manufacturers memorialised the government to repeal the duties on foreign silk manufactures. I say unfortunately, because that memorial probably assisted the French government in obtaining consent to their imposition of the duties I have mentioned.

It was just then that a series of adverse influences commenced to press upon the trade. The immediate consequences of the treaty were most injurious to our home manufacturers, in a way not previously imagined—consequences which will always act much to our disadvantage.

Previous to the treaty and the American war, the surplus and job silks of France were exported chiefly to America; but, when our ports were opened, the major portion of such goods were sent here, because of the greater facilities of transit, and of the more ready conversion of them into money; and thus our manufacturers had, and have still to contend, not only with superior excellence, but with goods forced upon their markets at ruinous prices, thereby reducing the value of home manufactures, and causing frequently most serious losses. This constantly recurring, and ruinous competition, is one of the main causes of the present depression. The following figures will show to what an extent French has supplanted English manufacture. The importation of French silks has advanced in value from £3,111,698, in 1860, to £10,214,700 in 1867. A large portion of that amount consists of goods not immediately saleable at cost prices, and therefore sold at great reductions, partly from being not suited to fashion, and partly from the monetary requirements of the manufacturer. Another portion consists of goods of superior taste, and of greater merit and value than our own. Thus, it is evident that the English manufacturer has a hard battle to fight, not only in competition with goods of superior excellence, but with a constant influx of goods sold below their cost.

Another difficulty still exists — the difference in cost of labour. The French and Swiss silk artisans are paid at the rate of fourpence per yard for the same work, which here obtains in wages sixpence per yard.

These are the foreign facts which have pressed so heavily upon the silk trade; but there are several home foes and difficulties, all of which must be subdued before we can get out of the wood, and reach safety, profit, and independence. We must meet and overcome the following obstacles, *inter alia*, scarcity, high prices, bad qualities of raw material, defective knowledge, and injurious trade combinations.

As to scarcity:—The causes of the diminished yearly crops of silk are—the disease which has devastated almost all the silk-producing districts of Europe, and the wars in China, whereby the mulberry plantations were destroyed to an immense extent. These deficiencies will probably continue for some years; we must therefore look elsewhere for supplemental supplies.

Considerations such as those I have adduced, led to the formation of the recently-established Silk Supply Association, the objects of which, although probably well known to most of you now present, I will briefly enumerate:—

1. To stimulate the production of silk in every country where the mulberry-tree is capable of giving food to silkworms.

2. To encourage the introduction and exchange of the eggs of the best kind of silkworms in silk-producing districts.

3. To offer practical suggestions and encouragement to

* See *Journal*, vol. iii., p. 197.

producers of silk for improving the quality, for securing a better classification, and for ensuring greater care in the reeling of silk.

4. To promote the cultivation of silk in the various silk-producing districts in India, where the production of silk has not recently increased, and in other districts of India, where the cultivation of the silkworm has almost ceased, but where certain special advantages, both as regards the growth of the mulberry-tree and the habits of the people, are known to exist.

5. To promote the exportation of cocoons from countries readily able to reel them.

6. To communicate with the Foreign, Colonial, and Indian Departments of her Majesty's Government, and with the authorities in the British colonies, and with the consular agents in all foreign countries, with the view of obtaining their aid to promote and extend the cultivation of silk.

It is intended that all the officers in connection with the proposed association shall be honorary, and that no payment shall be made, except for rent, clerks' services, printing, postages, and office management. It is estimated that a subscription of one guinea a-year will produce a sum sufficient to cover the necessary expenses of the association for the present.

Estimating the proceedings of the association hitherto, I have no doubt that, if moderately supported, we shall be successful in the work we have undertaken. We have found all the authorities to whom we have applied, whether in our colonies or elsewhere, most willing to afford us all possible assistance; but with regard to information on silk culture, we find ourselves able to give more than we receive. We are becoming a central means for collecting knowledge on silk culture, which we gather chiefly from Continental sources, and disseminate in appropriate form to new districts. In aid of this chief object I have, at the request of the association, compiled a small "Guide to Sericiculture," which, I believe, will not be without value to all desirous of silk instruction.

Another and more powerful means of promulgating useful information will be the "Journal of the Silk Supply Association," which will be published monthly, commencing on the 1st of January next, and will be transmitted free to all members of the association paying the annual subscription of £1 1s. I believe the circulation of this journal will be extremely beneficial to the interests of silk industry, as a means of establishing direct communication between all persons concerned in silk products, and as a medium for mutual instruction on all matters affecting the silk trade. Every friend to silk industry should be a member of the Silk Supply Association, and thereby assist in the restoration to prosperity, and in the further development, of an important national industry.

I will now briefly refer to those countries which we expect will materially aid our supplies.

India is capable of sending us contributions to an enormous and incalculable extent; but the whole system of silk production there, with the exception of European filatures, is of such rude and defective character, and consequently comparatively unremunerative, that we shall not induce the growers to extend their operations, unless we encourage them by such information as will stimulate their efforts to more profitable results. In very many districts, the worms and the trees are not suitable to each other, and, as the government commissioner reports, the native method of reeling the silk and tending the worms is as rough and untidy as it is possible to imagine. There, as in all eastern silk-growing countries, the natural means of production are very large, and, therefore, it is reasonable to expect increased quantities, when such information shall have been afforded as will enable them to profit by their advantages.

Our information from China is aggravating in the extreme, because there the worm and its food exist, notwithstanding ravages by wars, in an abundance which gives just opportunities for improvement and development; consequently, it is provoking to observe the falling off in quantity and quality. The difficulty of turning the Chinese from their old courses and accustomed proceedings is very great; they are obstinate conservatives. It is intended, however, to acquaint the intelligent and money-loving Chinaman, by information, to be published in his own language, that fine silk will pay him better than coarse and irregular silk, and that the greatly increased value will amply compensate him for a small increase in the cost of reeling.

From Japan we may expect much additional supply. Mr. Adams, Secretary to Her Majesty's Legation at Yokohama, visited, only a few months since, in company with four other gentlemen well versed in silk culture, the silk districts of Japan, and there found an extensive increase going on in mulberry plantations. His description of silk reeling shows how primitive is their system, and how much room there is for improvement. The report which Mr. Adams sent home is published in the "Guide to Sericiculture," and will be found exceedingly important.

An eminent mercantile house at Yokohama will be appointed agents of the Silk Supply Association, and will regularly transmit the most authentic information on the silk productions of that country. The Japanese silk is of the most valuable kind, and if it were reeled with European machinery and skill, would realise the highest obtainable prices.

California is making such extraordinary advances in mulberry cultivation that, in the course of three or four years, that country should produce at least one to two million pounds of silk. Mr. Warren, a commissioner from St. Francisco, told me that they had already planted about seven to eight millions of mulberry trees, and were proceeding to plant as many more; that statement is confirmed by other reports. The total number of mulberry trees in France is about seventeen millions, so that California is rapidly approaching that country in silk producing importance. "It is a question," says Mr. Warren, "to be determined this year, whether corn, wine, oil, or silk will be their chief product.

Egypt will soon help us materially, and the specimens of raw silk recently brought from there (some of which are now before you) are of first-class value. The information we possess of the capabilities of the country, and the encouragement which Nubar Pasha assured me the Viceroy would give to emigrants proceeding there to cultivate silk, affords good reason to expect that, in the course of a few years, Egyptian silk will rank among our valuable imports.

Going on to the Cape and Natal, we there find immense tracts of land suitable for profitable silk cultivation. A few enterprising growers have commenced operations under very encouraging prospects, and, estimating their primary products and reports, there can be no doubt of silk culture becoming a large and valuable occupation in that colony.

The *Sydney Morning Herald* says:—"Silkworms were introduced here some years ago; but the venture failed, in the first place, because no market was then open for the cocoons and silk; in the second, because the persons who undertook the business were imperfectly informed of what was to be done to insure success. The market now appears to be accessible through the agency of the association, and all we now require is the knowledge of which I speak. If this can be imparted in the way suggested, all will be plain sailing, or rather plain winding, for the mulberry will grow everywhere in New South Wales."

The following letter on the subject is most interesting:—

"Government Silk Commission, Cape Town,
"Cape of Good Hope, October 3rd, 1869.

"Dear Sir,—As the subject of sericiculture has lately occupied the attention of the legislature as well as the

agricultural societies of this colony, I shall feel much obliged if you can furnish me with any practical suggestions and assistance in carrying out this new branch of industry. The government have already imported from France and distributed 25,000 trees of the *Morus alba*, and six bushels of seed; and some thousands of eggs were also procured, in 1868, from Japan, through the British Consul, who, being Cape-born, naturally took a deep interest in the welfare of the colony.

"The government have also sent a lady, Mrs. Povall, who may already have called at your office, to learn the art of reeling in Europe. She is at present in a factory near Berlin, and will probably bring out the most approved machinery on her return next year.

"The main difficulty is to procure healthy eggs; and any assistance that you may be able to render the colonists in this first essential of silk culture, will be much appreciated both by the Commission and the colony at large.

"I shall forward you by this opportunity a practical treatise, which has been largely circulated by the government, as a guide to those who wish to pursue this branch of industry, and from which you will see that the mulberry tree not only thrives in every part of the colony, but that the species known as the Cape mulberry must have been originally introduced from Japan by the Dutch East India Company at a very early date, and has since been so thoroughly acclimatised as to receive the appellation of the 'wild mulberry,' being found even in forests and the remote districts along the frontier, and beyond the boundary-line.

"This fact alone is sufficient to justify the encouragement of silk culture, an industry particularly well suited to the native population, who cluster together, without any fixed employment, in villages and missionary institutions. A very favourable report, too, has been received from the Crown agent, regarding the quality of some cocoons which were sent to London, and from which some interesting specimens were manufactured. Should you wish for any samples of either cocoons or reeled silk, please let me know, and they shall be forwarded by the earliest opportunity. In the meantime, any publication containing practical suggestions and statistics concerning the exact number of worms, &c., will be thankfully received. "I am, &c.,

"J. C. HOLDING,
"Secretary to Silk Commission and Parent Agricultural Society.

"David Chadwick, Esq., M.P."

Nature, always bountiful and provident, is singularly assisting the extension of the valuable mulberry therein alluded to, for it is stated that "birds greedily devour the fruit; their digestive process does not affect the vitality of the seeds, which are voided in due time uninjured, often in the most solitary places, where they spring up, and in time become trees, and bear fruit, from whence again the same progress goes on."

Australian reports are even more satisfactory. The capabilities of that colony for silk production are practically unlimited. With good seed, knowledge, capital, labour, and skill, this country will, in due course, rival any other part of the world in sericiculture. Turkey, Persia, Russia and several smaller countries are now persevering in silk production.

With reference to increased supplies from France, Italy, Asia Minor, and Syria, these countries are still suffering from the fatal disease which has fearfully diminished their crops and the value of their plantations, but when that scourge shall have been overcome, the silk cultivators will know well how to profit by past experience.

And now, though last not least in importance, let me introduce the consideration of silk cultivation in this country. It has been carefully and practically tested by Capt. Mason, who expresses his conviction it may become a valuable agricultural produce. The cocoons and silk produced by Captain Mason, specimens of which are on the table, will bear comparison with the first qualities. It should be known that every mulberry-leaf, of whatever species, may be converted into silk, if duly elaborated by the silk-worm. In London and the neighbourhood, there are about 30,000 fine mulberry-trees, the leaves of which would suffice for a production of 10,000 lbs. of silk; extend this calculation to the southern parts of England and Ireland, and it will demonstrate the possibility of a large home production.

The ladies are certainly the most concerned in any efforts for obtaining better and cheaper silk. They must miss the useful qualities formerly to be had at 4s. per yard; and, doubtless, they would rejoice if the present ten-guinea dresses could be had for half the money. Well, if they would systematically educate a small family of silk-worms, and send their cocoons to the silk merchant, they would very materially increase the supplies. The world is capable of growing more silk than cotton. Yorkshire contains more acres than all the cotton producing acres of Georgia; but there is not a country on the earth, excepting in the frigid zones, where the mulberry will not thrive—and mulberry means silk. I recommend a system of division of labour, not generally practised on the Continent.

In all existing silk districts, the mulberry plantations and the "magnaneries" are in close proximity, and the cocoons produced therein are, excepting such as are exported, usually reeled in the neighbouring filatures. There is no necessity for this combination, and a due consideration of the fact should materially help home silk production.

The cultivation of the mulberry may be left to the agriculturist, who would supply the leaves. The rearing of the worms and production of cocoons might then be carried on in any localities, where suitable buildings and young people and children might most advantageously be found; and the cocoons so produced might then be sold to the silk reelers, throwsters, and manufacturers. Or the cocoons, instead of being sold for reeling purposes, might be retained for reproduction; and on this point I will give you the opinion of an eminent French sericiculturist, an opinion confirmed by Dr. Wallace and other scientific and practical men, to the effect that the mulberry of this country will, by reason of its hardy nature, and of its leaves containing an unusual proportion of silk-forming substance, viz., sugar and resin, nourish the worms to such a degree of health and vigour, that their eggs would reproduce a superior breed, and would be valued accordingly. There is, therefore, much inducement for the introduction of this valuable occupation. There are numerous uncultivated places where the mulberry would thrive, and there are scarcely any places where its cultivation would not be remunerative. The leaf production would be much later than on the Continent, but the incubation of the eggs may be retarded, so that the worms need not be hatched until their food is ready for them.

The annual failure of silk eggs from European races compels silk cultivators universally to rely upon eggs from Japan. Consequently, the immense demand made upon that country, and the greatly increased value of the eggs, has induced the Japanese to produce them in preference to silk, and hence the supply of silk from there has much diminished, while the exportation of eggs has increased to such an extent, that the quantity sent last year to Europe exceeded two million ounces. This fact urges another good reason for cultivating the mulberry, and breeding silkworms in this country for purposes of reproduction.

Having, then, reasonable expectations of a considerable increase in quantity, let us consider how the quality may be improved. The quality of silk depends entirely upon the number of cocoons reeled together, and so forming single threads known as raw silk. This process is carried out to the greatest present perfection in France and Italy, and in other countries where the filatures are under duly skilled management. The branch of cocoons

before you will attest the excellence of French "education" of silk worms; but, in China, Japan, India generally, Persia, and other parts of Asia, the native reelers, possessing only the most clumsy machinery, and being unable to appreciate the superior value of fine and even silk, reel off their cocoons in such a careless manner that the silk so produced is very inferior to what it might be. This fact alone demonstrates that the formation of silk threads from cocoons, suitable for the various branches of manufacture, should be carried on in manufacturing countries. France has well understood the importance of reeling for her own manufactures. It is time we should imitate her example. Therefore, whether we grow silk at home or not, there can be no doubt of the importance of introducing silk reeling, and thereby inducing all new silk-producing countries to send their cocoons to English instead of to foreign markets. On this point there is a singular want of information, which I will endeavour to supply. It is generally supposed as indispensable to good reeling, 1. That the external climate must be dry and bright. such as that of France and Italy. 2. That the cocoons must be fresh, *i.e.*, not desiccated, nor packed with any pressure. 3. That the process of reeling is a labour unsuited to our operations. 4. That the cost of labour on the Continent is so much less than in this country, as to preclude profitable competition.

As to climate:—All cocoons are reeled in very hot water, a condition which may be had in any country.

As to cocoons:—The general practice in all countries is to dry the cocoons under a hot sun, or by artificial heat, generated by hot air or dry steam. This is an obvious necessity, for if the chrysalides are not suffocated within a few days after the formation of the cocoons, they will, as moths, work themselves out of their shrouds, and destroy the value of their labours; and, unless thoroughly desiccated, the juices of their bodies will, under pressure in packing and removal, materially injure the silken filaments.

The reeling is a very simple operation, performed by women and children of very ordinary intelligence, who, by force of habit, acquire a ready mode of manipulating the delicate material; their wages are about the same as those paid to our silk winders. I affirm positively that, if properly established, the important business of silk reeling may be as profitably carried on in this country as on the Continent. It would enable our manufacturers to readily obtain silk threads suitable for their fabrics, instead of having to make fabrics to suit the present varied, and never to be relied upon, qualities of raw silk.

An inspection of the bonded silk warehouses will satisfy any visitor of the slovenly, careless, and wasteful manner in which raw silk is originally packed. A cotton-spinner would be ashamed of it. Bundles of silk worth £20 are made up with less care than are bundles of cotton worth only 20s. Unfortunately, the reeler and the manufacturer do not meet in those rooms, and, consequently, they have no opportunity of conferring on their mutual grievances. The sales are effected by the middle-men—the silk brokers and merchants—gentlemen whose interests are not so much concerned in quality and condition as in large amounts and proportionate commissions.

The greater portion of silk passing through these warehouses is from China and Japan. The annual sales exceed £5,000,000, and almost the whole of that silk is so defectively reeled, that the value of it is not worth, by 10s. per lb., what it would realise if it were skilfully reeled. Oh! if the cotton trade had such a chance of improving their raw material, how soon they would commence the reformation.

But, in addition to obtaining more silk and improving its quality, there still remains much to be done before we can successfully compete with the looms of Lyons, Zurich, and St. Etienne. Neither protection nor reciprocity can restore prosperity. We must manufacture, not only as well, but as cheaply, as our rivals, if we are to compete with them in the general markets of the world. Manufacturers and their weavers must be better instructed in their trade, and schools of theory and practice, of design, and general technical education must be established, and must be appreciated by every superior operative. And here I would venture to suggest to the Council of the Society of Arts that the introduction of schools of manufacture would, in my opinion, be a very appropriate subject for them to take up, for their establishment would most materially aid the improvement of the industry of the country. The hand-shuttle of Spitalfields must be replaced by the fly-shuttle of the North; the old-fashioned modes of winding and warping must be superseded by modern improvements; the hand-loom is doomed, and must make way for its iron competitor the power-loom, and the whole system of our silk manufacture must be regenerated and brought under factory discipline. The present depression of the trade, and a certain amount of apathy, impede the progress of improvement; but when we get cheaper and better silk, and when all available economy of labour and skill are combined, the poorly-paid artisans of the Continent will have hard work to match the productions of mechanical appliances perfected by science and art. France buys her cotton at the same price we do, but the looms of Lancashire and Yorkshire can, even with present duties, meet numerous French productions in their own markets. Silk manufacturers may do the same, if they will set the right way about it.

There is another barrier which occasionally impedes beneficial progress—the regulation of wages by trades' unions or societies combined for the same purpose. All such general laws cramp the individual will of the operative, and fetter the power of the master in competition with the foreigner. Supposing a manufacturer, by means of enforcing lower wages, to obtain an advantage over his competitor, such unfairness will rectify itself by the extra demand for the productions, to meet which, and to obtain additional labour, additional remuneration must be paid. High wages, if they cannot be maintained, eventually ruin the class which temporarily enjoys them. I recollect the time when sixpence per yard, for ordinary low qualities of silk goods, was paid to the Spitalfields' weaver, under his book regulations, for precisely the same work performed in Lancashire for fourpence. The difference was, of course greatly to be regretted on the part of the Spitalfields' weaver, but the consequence was most natural—that branch gradually left London and settled in the north. Such mistaken policy has often been pursued in manufacturing trades, and invariably to the loss of those who would not acknowledge the irresistible force and power of competition.

I have been very severe in my strictures upon an industry in which I am personally interested, and which has my best sympathies and wishes, but I have exposed its short-comings, because I believe there still exist in the trade a vitality and a strength which, if duly exerted, will in time render the silk-trade profitable to all concerned as merchants and employers, and will give to thousands of additional operatives—especially women and children—an occupation which, in regard to cleanliness, pleasantness, and healthiness, is not surpassed by any other employment.

At the conclusion of the paper, Mr. Dickins drew the attention of the audience to a collection of cocoons from France, showing the remarkable manner in which the silkworms arranged themselves on the shrub. A smaller spray was also shown, of English growth, with cocoons upon it, equal in size and quality to the French, and specimens of the wound silk, produced by Captain Mason, were also laid on the table, together with skeins and cocoons from Egypt, Natal, Japan, and elsewhere. The most remarkable object, however, was a small collection of cocoons from the Royal Gardens at Kew, being the second generation in the present year. Mr. Dickins

said he believed this was the first occasion on which such a thing had been seen, and it was a most gratifying fact, inasmuch as it went to show that two crops of silk a-year might be produced in England.

DISCUSSION.

Mr. COBB, of Natal, said the advisability of reeling silk in England had been suggested in the paper, but the truth was, that in respect to the colonies, it was an absolute necessity, there being no skilled labour available for the purpose there. The Silk Supply Association was, therefore, he believed, very wisely recommending the colonies to cultivate silk, as far as the production of the cocoons, but not to attempt the reeling. The great difficulty at present, however, was, that there was no market for cocoons in England, the fact being that Lyons and Marseilles were the only two markets in Europe. The Americans, being alive to this fact, were introducing in California machinery for reeling and manufacturing the silk in close proximity to the place of production. After all, however, the reeling was a very simple operation, in no way affected by climate. He had, in China, seen a decrepit old woman engaged in reeling silk on a machine made of bamboo, and she had probably been many years engaged in the same occupation; and last year, in South Africa, two or three young English ladies determined to make the attempt, and the specimen on the table, which was the result of only their third trial, would compare not unfavourably with the work of the best French reelers. This showed how easily the process might be acquired, and at a time when thousands of silk winders in Coventry and Macclesfield were starving for want of employment, it seemed a great pity that some efforts should not be made to introduce a branch of industry so nearly allied to that to which they had been accustomed, and which they could very soon learn. As to the quantity of silk which South Africa could produce, he had no hesitation in saying, from having visited nearly 180 miles of coast-line, abounding in hills and valleys, and resembling both geologically and botanically the best silk-producing districts of Japan, that it could easily produce a quantity equal to the whole of Italy. He had reason to believe that the same conditions prevailed in many parts of New South Wales and Queensland. In California, there were already nearly half as many mulberry-trees as in all France, and specimens of silk had been produced equal to the majority of Italian. He had no doubt that, before long, an increased supply would come from Japan, but it would be many years before the Chinese silk-districts would recover from the effects of the adverse influences to which they had been subjected. Promising accounts, however, had recently been received of the cultivation being introduced into fresh localities, especially near the northern part, where Europeans had recently been admitted. The rearing of seed, or silk-worm's eggs, was a most important point, and one that should not be lost sight of in England, where there was no doubt that healthy seed could be produced, so as to supply the deficiency on the Continent. Last year the exports from Japan were over two millions of cards, whilst, this year, it was anticipated that not more than one million could be exported, only half that quantity having as yet been obtained; the price, in consequence, had risen from about 5s. to 22s. 6d. per card. It was therefore an important question, whether the agriculturists of England could not plant sufficient white mulberry-trees to supply food for the silk-worms, which other people, who might give their time and attention to the matter, might rear.

Mr. ANKETELL, being called upon to state the results of his experiments in Egypt said he had met with great difficulties, arising, in great measure, from the ignorance of the natives, and the dishonesty of Europeans; and he was obliged to give a great deal of personal attention, in order to ensure success. He had no doubt that the cultivation could be successfully carried on there, if it were properly conducted, but this had not yet been done. When he began his experiments, he was told that the hot winds would be an insuperable difficulty, for that, on a former occasion, a mud wall two feet thick had been built, and the worms shut in during the prevalence of these winds to prevent the ill effects; the consequence, no doubt, was, that they died of suffocation, which was not to be wondered at. He found, however, that the hot winds might really be turned to advantage. He intended to return to Egypt, and renew his experiments, provided that the present differences between the Sultan and the Viceroy did not end in a state of things which might prevent the cultivation of anything whatever.

Mr. BRIGGS stated his belief that the depression in the English silk trade was due, in part at least, to the weight of taxation, which, as he alleged, pressed more heavily on British workmen than on their continental rivals, and thus rendered them unable to compete on equal terms.

Mr. P. L. SIMMONDS said the subject of silk supply, both home and foreign, had often occupied the attention of the members of the Society of Arts, and might frequently, even yet, be discussed with advantage. Although he was not quite so sanguine as to the success of any attempt to produce silk on a large scale in England as Mr. Dickins, yet the effort deserved encouragement. The Society of Arts had frequently stimulated and encouraged the production of silk in England, but as yet no very extensive results had been obtained. The whole question of our foreign supply of silk, and the condition of the silk manufacture at home and abroad, was of the greatest interest, and one which, for many years, he (Mr. Simmonds) had studied with much care. Associated as he had been, as honorary secretary from the formation of the Silk Supply Association, and having carried on the official correspondence with the various heads of public departments, he necessarily felt a warm interest in its success. Although circumstances had led to a cessation of his active co-operation, still his sympathies would always be with the association and its able president. The paper on the production of silk in India, which he (Mr. Simmonds) had read before the members, some few months ago, had attracted attention on the Continent, since he had met with it translated into German, French, and Italian. In addition to the information respecting Australia which Mr. Dickins had furnished, he might state that the colonies of Queensland, Victoria, Tasmania, and New Zealand, were all energetically occupied with the question of silk production; and in South America, the Republics of Ecuador, Venezuela, Chili, Uruguay, and the Argentine Confederation, were also turning attention to it, and sent very fine specimens of cocoons and silk to the Paris Exhibition. Without endorsing to its full extent the statement by Mr. Dickins, that "there is not a country on the earth, excepting in the frigid zones, where the mulberry will not thrive," there was ample room for its extension. He would not further detain them, but would send to the secretary for publication some notes, which might be considered as supplementing Mr. Dickins's remarks.

Mr. HYDE CLARKE congratulated the members present on the progress which the subject of silk cultivation was evidently making. It might be an open question whether they would be more successful in producing a large crop of silk in this country at present than they had been in the past; but the samples before them that evening showed conclusively that, with care and attention, very good results might be obtained. There was, however, at the present moment, one thing of even greater importance than the production of a large crop of silk in England, and that was the carrying out of a series of experiments with regard to the cultivation, having reference especially to the health of the silk worms. He would, therefore, urge very strongly upon the consideration of all who had an opportunity of devoting attention to this subject, the fact that there

was in all countries a great want of judicious and well-conducted experiments, with regard to the disease which had latterly afflicted the worms. It was in Italy that the most successful observations had been made on this subject, but in many silk-growing countries, there was no educated, intelligent body of persons who could conduct such observations. No greater good, therefore, could be done than for ladies, and others who had time at their disposal, to pay careful attention to the rearing of the worms, and to communicate the results of their observations to the Silk Supply Association. In order that this might successfully be done, however, it was necessary that there should be a much better supply of food, by an increase of the white mulberry, which was stated by a high authority, Dr. Hogg, to thrive very well in England. He should recommend, therefore, an effort being made, not only in private gardens, but in the public squares and parks, to cultivate some of these trees, which would afford sustenance to the silkworms, and by this means an impetus might easily be given to silk production. Of the many important subjects mentioned by Mr. Dickins, he did not think there was any more deserving attention than the suggestion which he made as to the breeding of what was called "grain" or silkworms' eggs in England, and it seemed to him that, in many localities, it might become a means of both amusing and profitable employment. It frequently happened that when one country was afflicted with disease, another was comparatively free, and a good supply of healthy eggs at such a time would be a source of considerable revenue. With regard to the process of reeling, he had often seen it in operation in Turkey, and, as had been said, it depended in no way upon climate, the cocoons being always placed in hot water; and there was no reason why Englishwomen should not earn their living at such employment as well as Turks, Greeks, and Armenians.

Mr. PHILIP PALMER thought it would be useful if Mr. Dickins would give them a little more detailed information. For instance, if he would state how many thousand silkworms it might be worth while to rear; how many were required to make a pound of silk; and how many acres of mulberry-trees would be necessary to give a good start to the cultivation.

Mr. DICKINS said all the information asked for was to be found in the little book referred to in his paper, and published by the Associtaion, price one shilling.

Mr. BOTLY thought they must all feel indebted to Mr. Dickins for the very able and practical paper he had given them. All those who were interested in the colonies—and there were few who were not so in some way—must be much gratified to find what prospects of prosperity there were before them through the cultivation of silk; and he could not but believe that the efforts which the Silk Supply Association was making to diffuse information would produce good and lasting results. He could fully endorse, from his own observation, the remarks which had been made with reference to the dirty and untidy manner in which the silk was packed abroad for exportation.

Mr. ELLIS DAVIDSON said he should not have felt qualified, as a teacher, to take any part in the discussion, but for the reference which had been made by Mr. Dickins to the establishment of schools of manufacture. There was no doubt in his mind, that in such schools, as in the constitution of the Society under whose auspices they were met together, the arts, manufactures, and commerce should be combined. The great value of the paper they had listened to with so much interest was its eminently practical character, but he should like Mr. Dickins to state whether the great impediment to the culture of silk in this country hitherto had not been the fact that the mulberry tree bore leaf at a different time from that at which the silkworm would naturally be developed from the egg.

Mr. DICKINS remarked that he had already touched upon that subject.

Mr. DAVIDSON said he had not observed it, and at any rate it was a most important point to be kept in view, for it was a very different thing to produce results artificially by experiment, and to establish a national industry. At the time of the Paris Exhibition of 1855 a question had been suggested which had not yet, as far as he was aware, received any satisfactory solution, and it was this:—If, as was admitted, the mulberry leaf contained the whole of the constituents of silk, what was the chemical action which took place in the internal organism of the silk worm which converted the one material into the other. If this could be definitely ascertained, the time might come when they would be independent of the silkworm, and be able to manufacture silk for themselves direct from the leaf.

Lord HENRY G. LENNOX, M.P., Chairman of the Council, being called upon to propose a vote of thanks to Mr. Dickins, said he had much pleasure in undertaking this agreeable duty, but his parliamentary experience taught him that, while it was very pleasant to sit and listen to the discussion of matters which one did not thoroughly understand, it was much the wiser part to say nothing oneself on a topic which one had not thoroughly mastered. He should not, therefore, think of inflicting upon the audience his own views on matters which many amongst them knew so much more about than he did. He might say, however, with some pride, as Chairman of the Council, that this was a subject to which the Society of Arts had long paid attention. The secretary had put into his hand one of the Society's records, about 25 years old, which stated that the Society's gold medal had been awarded to a lady for the silk which she had produced, the locality being the south of Hampshire, in the district near Lymington. At that time the failure, he believed, arose from a difficulty in finding a market for the silk after it was produced. He quite reciprocated the wishes of the gentlemen opposite, who desired that all taxes might be taken off, but he feared there was not much probability of so happy a result being attained. Whatever their opinions might be upon such matters, however, he was sure they would all cordially join in a hearty vote of thanks to Mr. Dickins, and in wishing that every success might attend the endeavours he was making to promote a branch of industry which seemed so well calculated to prove beneficial, not only to the mother country, but to almost all her dependencies and colonies.

The CHAIRMAN, in putting the motion, said knowing, as he did unfortunately, the miserable condition of the operatives of Coventry, Congleton, Macclesfield, Manchester, and, above all, of Spitalfields, he felt that anything which could be suggested for the amelioration of it deserved the most earnest attention of the public. If it were the fact that they could produce in England silk of as good quality as that produced in France and Italy, all that was required being to bring capital, land, and labour together, surely they had sufficient of each in England for the purpose, and every right feeling ought to induce them to do all they possibly could to relieve the starving populations he had referred to, by promoting an industry so well fitted to their previous education. He had formerly been of opinion that the place for reeling silk should be somewhere near the place of its production, but when he remembered the rapidity with which transit was now effected between all parts of the world and England, he no longer clung to that old opinion, and was disposed to think that the best plan would be, when the worm had done its work, to bring the raw material to this country, where all the necessary labour might be concentrated upon it. There could be nothing in the climate to prevent it being properly reeled, for at present this operation was always conducted in sheds, artificially heated or cooled. In our climate it was scarcely ever too hot, and the requisite degree of heat could always be obtained artificially within a single degree. If they could, by setting up reeling establishments in the centres of the silk manufactures, produce precisely the quality of silk

required for the various fabrics to be produced, surely it was a matter demanding the very serious attention of the nation, and of the legislature. Mr. Dickins had done great service in bringing this matter forward, and he was sure that if a sufficient quantity of cheap material could be brought to this country, our operatives possessed skill and intelligence which would enable them to compete with any country in the world. The weavers in the various districts were as well up to their work as any that could be found either in France, Switzerland, or Germany, and it was an insult to our female population to suppose that they were not capable of taking up the finest filaments of silk and reeling them properly, especially when they considered that this was at present done by the clumsy fingers of the peasant population in Italy and France. If this could be done, and he was sure it might, there was every reason why all the influence they could individually bring to bear upon this question, should be put forth, and that, at all events, an experiment should be tried. Captain Mason had already proved that the production of silk could be successfully carried on in this country, for he (the chairman), as a man practically acquainted with the subject, could say with the greatest confidence that the silk that gentleman had produced was as good in every respect as that brought from France or Italy. If that were so, why should not the same thing be carried further? It was no new question in England, for in the time of Queen Elizabeth large premiums were offered to persons who would plant mulberry-trees and breed silkworms, and hence the large number of mulberry-trees which were to be found in some parts of the country, especially in the South-Midland counties. The importance of this subject could hardly be overestimated, when it was considered that some hundred thousand people, who ought be occupied at the present moment in the silk trade, were, many of them, going into coal pits, and other branches of labour altogether different from that to which they had been accustomed. One suggestion had been put forth by Mr. Dickins, which he, as an old member of the Society, and formerly a member of the Council, might be excused for saying one word upon, the introduction of schools of manufacture. This was a very large question. The Society professed to encourage arts and manufactures, but to establish schools of manufacture was, he thought, a little beyond their power. He held that every manufacturing town ought to have in itself a school of manufactures, and not only so, but that every manufactory itself ought to be a school of manufacture, and the head of the establishment ought to be so intelligent and so well acquainted with every department, that the whole of his dependents would be like so many scholars who were gradually being educated up to his own ideas. It was a bold statement, but he had made it before, and he now repeated that he did think there were ten men conducting the silk manufacture in England who were themselves practically acquainted with every process through which the silk passed. On the Continent it was far otherwise. In France, Switzerland, or Germany you could hardly find a large silk manufactory in which the head of the establishment was not the most skilled man in it, having gone through every department, from the reeling and winding of the silk to the last process in the manufacture. When the ill-trained or rather untrained manufacturers of England had to compete with such men as these they naturally had no chance. The chairman concluded by putting the motion proposed by Lord Henry Lennox, which was carried unanimously.

Mr. Dickins thanked the meeting for their appreciation of his efforts to promote the prosperity of the silk trade, which he should always endeavour to do by every means in his power. He briefly alluded to the observations of the various speakers, none of which called for particular remark except the statement of Mr. Botly, confirming his own, as to the state in which the silk arrived in this country. He should have been much pleased if any one had been able to deny it, for it was a positive disgrace to the trade that the silk should be allowed to come over as it had for the last fifty years or more. The brokers were the only persons through whom they could reach the foreign merchants, and he did hope they would do something to change the present state of things. Mr. Davidson had referred to the weaving schools of Lyons, and his impression was, that that was one of of the most important points they had had under discussion. From a residence of some duration at Lyons and elsewhere on the Continent he was able to say that, so much were these schools appreciated there, that not only mechanics, but persons of superior station, were in the constant habit of attending these establishments, in which theory and practice were combined, and to this, more than anything else, he attributed the superior excellence which all must acknowledge was possessed by the foreign silks. There was no reason why Englishmen should not be equally well taught, and then he had no fear of their producing equal results. In conclusion, he expressed a hope that many of his audience would join the Silk Supply Association.

Captain Tyler then proposed a vote of thanks to the chairman, and said that he had no doubt that if the Association could experimentally prove, on a substantial scale, that silk cultivation could be successfully carried on in England, it would soon be taken up and developed by capitalists and others.

Mr. P. L. Simmonds writes as follows:—"An important British industry is just now suffering materially from a deficiency of the raw material, and Great Britain is not the only sufferer. The silk trade in Europe generally is languishing, owing to the long-protracted effects of the disease in the silkworm. Up to 1824, the period of the removal of prohibitions by Huskisson, and after many ages of protection, the silk industry in England may be said to have merely vegetated, and the number of looms for weaving ribbons and stuff never exceeded 24,000. Six years after the removal of the prohibitions, viz., in 1830, there were 50,000; and, in 1855, the number exceeded 100,000. In 1862, judging by the quantity of silk taken for consumption, there were more than 150,000, producing manufactures of the value of £12,000,000, of which the sixth part only was exported. Raw silk has advanced in price enormously of late years. There are no sumptuary laws now in existence restricting the use of silk to any class, and it is worn more or less by all ranks of society in most countries; indeed, with the spread of wealth, its more extended use is only retarded by the extravagantly high prices. The stagnation and decline in our own factories is shown by a comparison of the two last official returns of the Factory Commissioners. In the close of 1861, there were 771 silk factories at work in the United Kingdom, with 1,338,544 spindles and 10,709 power-looms, giving employment to 52,429 hands, of whom about 37,000 were females. At the close of last year, there were but 591 silk factories, with 1,159,706 spindles and 14,625 power-looms. These employed 41,017 hands, of whom about 29,000 were females. Many of these factories have since been closed, and we thus find more than 12,000 persons, formerly profitably engaged, have been thrown out of employ, and 180 factories closed in the past seven years. This tells terribly upon the great centres of the silk industry, Macclesfield, Coventry, Manchester, &c. But the Continent, which gives more attention to silk manufacture, is suffering equally with ourselves from a deficiency in the supplies of this important trade material. Silk production has been sorely tried in France during the last twelve years. In the greater number of the departments, where the rearing of the mulberry formed considerable riches, there reigns a general desolation. Of the various countries which give attention to silk production, Italy and France stand in the first rank,

and their winding and throwing establishments have rapidly increased, each country contesting which can turn out the best productions. Austria follows in the movement; Turkey and Russia are not strangers to progress; while Spain also produces silk of a good quality. The quantity of silk produced by France and Italy is much more considerable than that of all the other States of Europe; but attention has of late years been much directed to the seats of production in Eastern Russia, Turkey, and Japan, which have not been attacked by the fatal disease which has proved so injurious to the silk-worms of parts of Europe. In 1853, the production of cocoons in France was about 26 millions of kilogrammes (of 2¼ lbs). This represented at least 2 million kilogrammes of raw silk of the value of 150 millions of francs. In 1854 and 1855, the production began to decline to under 20 millions, the disease called pebrine having manifested itself in the worms. In 1856, the evil increased, the rains were heavy, the crop of cocoons did not exceed 8 millions, and the price reached the unheard-of figure of 7½ to 7¾ francs per kilo. From 1857 to 1860, the production stood at about 9 millions. In 1861 and 1862, the production again fell, and so continued, notwithstanding the introduction of new seed from Japan, until, in 1865, it had declined to about 5 million kilogrammes of cocoons, and the price rose to 7 and 9 francs the kilo. They have since then even gone higher, 8 and 10 francs being asked and paid. In 1866, all the efforts of Europe were turned to the introduction of healthy seed from Japan, more than 2½ million ounces of eggs having been shipped from there to various countries. Unfortunately, a very mild winter brought forward the eggs too soon, and a great loss was sustained, so that, instead of the production anticipated, the crop in France did not exceed 10 or 11 million kilogrammes of cocoons. In 1867, about 2 million cards (each card contains on the average 25 grammes) of silk-worms' eggs were shipped from Japan, of which three-fourths were for Italy, and the rest for France. The amount of insurance effected on these while in transit was something enormous. Considerable loss and inconvenience were experienced at first by extensive frauds perpetrated. The eggs of Chinese silk-worms were sent over to Japan, and there re-packed under the seal of the French Consulate, fraudulently obtained or imitated, and this was sent off to Europe as pure and healthy Japanese seed. The import and export figures speak prominently and forcibly as to the importance of the silk industry in France. The average annual value of the silk imported into France, from 1837 to 1846, was 60 million francs, from 1847 to 1856, 122½ millions. In 1860, it was 260½ millions; in 1865, 429 millions; and in 1866, 383 millions. The raw silk exported was to the value of 45 million francs in 1859, and 107 millions in 1865. The value of silk goods of all kinds exported was 1,347 million francs average, 1837 to 1846; 2,747 from 1847 to 1856; 4,548 in 1860; and 4,677 in 1866. In 1862, the value of the silk manufactures, &c., locally used, was set down at 220 million francs, and of those exported at 440 millions; making a total of 660 millions. The value of the French silk manufacture can now scarcely be estimated at less than £40,000,000 sterling. The value of our imports of French silk manufactures has increased 6½ millions since 1860. There are stated to be about 2 million workpeople directly or indirectly interested in silk production and manufacture in France. The quantity of raw silk produced in Italy, before the outbreak of the silkworm disease, was 3,710,000 kilogrammes; since then it has yearly decreased, and in 1868 it only reached 1,900,000 kilos., or little more than half. But this is not all. About 10 to 10½ kilos. of silk used to be obtained from 100 kilos. of cocoons in Tuscany; now it is with difficulty that 7¼ to 7½ kilos. of silk are obtained from the same quantity. In Russia, the total production of silk fabrics exceeds 2½ millions sterling. In Switzerland, two or three small cantons employ about 60,000 looms, and export silks and ribbons to the value of 4 millions sterling, to England and North America. The German Customs Union is, however, closed to foreign silk manufactures, since they possess factories, which work from 10 to 15 per cent. cheaper. Although the production of silk extends in China over all the zone comprised between the 37 and 23 degrees, and more especially between the 33 and 29, no part produces it so abundantly as the province of Tché-kiang, which is equal to that of all the rest of the Empire. If, in a good average year, China produces 120,000 bales, it may be said that Tché-kiang furnishes 60,000, which represent a value of about 180,000 millions of francs. But as it is from the departments in the north of the province, and those which approach to Shanghae, which produce the largest part of this silk, there comes to Ning-po only that which is raised in the plains of Shao-chin, which, before the rebellion, yielded 10,000 bales. In 1863, the export was but 50 piculs; in 1864, 949; and in 1865, 1,914. A part of this silk, of too inferior a quality for Europe, is used up for native fabrics. The silk manufacture constitutes one of the principal industries of Tché-kiang, and especially of the capital, Han-tchéou. There was exported, in 1865, to the value of 1,794,000 francs, against 102,000 francs only in 1864, a proof of the increase of prosperity of the silk industry in Tché-kiang.

Proceedings of Institutions.

Alnwick Mechanics' Institution.—A most creditable exhibition was opened on the 4th of November, under the auspices of the above institution, in the Corn Exchange. The walls are decked with a very numerous collection of oil and water-colour paintings, as well as many cases of English and foreign birds; while the tables were covered with fossils, coins, sculpture, and curiosities. In nearly every case the contributors are local people—many of them being the painters or sculptors of the art subjects shown. The inaugural ceremony was performed by his Grace the Duke of Northumberland, in the evening. Additional interest was attached to the proceedings, by the presentation of prizes to the successful candidates in connection with the Science and Art Department and the Society of Arts. Mr. A. Robertson, jun., one of the hon. secretaries, read the annual report in connection with the science and art department of the institute. After describing the nature of the grants and facilities which the government afforded in order to enable the students to obtain a superior education at a mere nominal fee, and noticing the nature of the prizes awarded as an incentive to excellence, the report went on to show the progress which had already been made. In the year 1860, there were in the United Kingdom only 500 individuals who availed themselves of the aid thus given; but, in 1867, the number had increased to 10,000; and during the last session of 1869, there were 21,000 students receiving instruction in science schools. Northumberland itself was a fair illustration of this advance. When the school began in Alnwick, there was not another in the county, and yet no less than ten could now be found in the great centres of industry. Less than two years ago, a meeting was held in the Alnwick Town Hall, under the presidency of the Rev. Court Granville, to hear a lecture by Mr. Buckmaster on the subject; and it was not until then that classes in drawing were established, under Mr. T. Collinson, assisted by Mr. Brown, and in mathematics under Mr. T. Muxlow, B.A. No fewer than 86 members at once enrolled themselves as students; and, although the session was far advanced when the classes began, the examinations resulted in the award of 34 certificates of merit, and 10 Queen's prizes. After the summer vacation, a class was formed for the teaching of organic chemistry, under Dr. McVail—the total number of students, in all classes, then being 93; but, in addition to the examinations of the Science and Art De-

partment, recently concluded, many of the students had submitted themselves to the Examinations of the Society of Arts, and 46 certificates and 14 prizes had been gained. It was thus seen that the students of the Alnwick school had obtained 80 certificates and 25 Queen's prizes; while there had also been received from government, in capitation grants to teachers and towards the purchase of examples, no less a sum than £70. The report concluded by referring to the satisfactory results which had followed from the classes. The Duke of Northumberland then delivered an address, and presented the prizes to the successful candidates. Various short lectures were then delivered, and the evening concluded with a *conversazione*.

WHITWORTH EXHIBITIONS.

The £25 exhibitions which Sir Joseph Whitworth offered last year, previous to the competition for the £100 scholarships, proved so successful in bringing together a number of students, who, by the aid of the exhibition, had been able to devote a considerable time to their preparation for the examination for the scholarships, that Sir Joseph has this year offered sixty £25 exhibitions, in preparation for the 1871 competition. These exhibitions have only just been awarded as follows:—

	No. of Exhibitions.
Bath, Proprietary College	1
Birkenhead, Collegiate Institution and Proprietary School	1
Bolton, Science and Art Institution	1
Belfast, Queen's College	1
Birmingham, Birmingham and Midland Institute	1
Birmingham, Grammar School	1
Bristol, Trade and Mining School	2
Cambridge, University	2
Cardiff, the Mayor	1
Cheltenham, the College	1
Clifton, the College	1
Crewe, Mechanics' Institute	1
Cork, Queen's College	1
Darlington, the Mayor	1
Derby, Derby School	1
Dublin, Trinity College Engineering School	1
Dundalk, Chairman of the Town Commissioners	1
Durham, University	1
Edinburgh, University	1
Edinburgh, High School	1
Edinburgh, Watt Institute	1
Galway, Queen's College	1
Glasgow University	1
Glasgow, Anderson's University	1
Glasgow Mechanics' Institute	1
Halifax Working Men's College	1
Harrow, Harrow School	1
Leeds, Grammar School	1
Leeds, Mechanics' Institute	1
Huddersfield, Mechanics' Institute	1
Kilmarnock, the Provost	1
Liverpool, Liverpool Institute	1
Liverpool, Northern Institute	1
Liverpool, Free Library Classes	1
London, University College	1
London, City of London School	1
London, Christ's Hospital	1
London, King's College	1
London, St. Peter's Collegiate School	1
London, Birkbeck Institute, Southampton-buildings	1
Manchester, Owens College	2
Manchester, Owens College (Evening Classes)	3
Manchester, Free Grammar School	1
Manchester, Mechanics' Institute	1
Manchester, Salford Working Men's College	1
Marlborough, School	1
Newcastle-on-Tyne, the Mayor	1
Northampton, the Mayor	1
Nottingham, High School	1
Nottingham, Mechanics' Institute	1
Oldham, Lyceum	1
Oxford, University	2
Plymouth, the Mayor	1
Preston, the Institution, Avenham	1
Rossall, School	1
Sherborne, the King's School	1
Southampton, the Hartley Institution	1
Stockbridge, Queenwood College	1
Sheffield, the Mayor	2
Woolwich, &c.	1
Wokingham, Wellington College	1
Wolverton, the Institute	1
Worcester, the Mayor	1
Awarded on the results of the competition for Scholarships, 1869	10

It is to be hoped that the competition of 1871 will be as well attended as this year's was.

INSTRUCTION IN SCIENCE AND ART FOR WOMEN.

Professor Huxley continues his course of lectures, at South Kensington, on "Physiography." The farther into the subject he takes his audience, the greater becomes the amount of interest. The fifth lecture, upon the reparative agents of nature, is particularly engaging; and there can be no doubt that the information regarding the interior of the earth, as well as the explanation which Professor Huxley has given of volcanic action, will tend to clear away many of the misgivings which possibly most of his audience have had on the subject. The following are the notes:—

LECTURE IV.

1. Every thousand pounds of Brighton sea-water contains about twenty-seven pounds of common salt, and eight pounds of other solid matters, making thirty-five pounds in all. If a certain measure of pure fresh water weighs a thousand pounds, the same quantity of Brighton sea-water weighs a thousand and twenty-seven pounds. A thousand pounds of the water of the Thames at Twickenham contains only a little more than five ounces of solid matter, the greater part of which is carbonate of lime. If a certain measure of pure fresh water weighs a thousand pounds, the same quantity of Thames water weighs about a thousand pounds and five ounces.

2. The sea is set in motion by tides, currents, and winds. When in motion, it tends to wear down the land, and gives rise to marine denudation.

3. Cliffs and beaches, shingle and sand, are the results of marine denudation, accompanied or not by pluvial denudation.

4. The motion of the largest waves is almost perceptible at a depth of three hundred fathoms (a fathom = 6 feet). The denuding action of ordinary waves must be insignificant at a third of this depth. The sea therefore acts upon the land as a sort of rotating chisel, and tends to cut it down to the depth of 100 fathoms below the surface.

5. Other things being alike, the indentations and headlands of a coast depend upon the nature and arrangement of the strata of which it is composed.

6. Supposing rain and rivers to have reduced all the land of Britain to the sea level, marine denudation would gradually plane down what was left, until, in place of the land there was sea 100 fathoms deep.

7. The materials thus worn down into fine sand would be carried away by tides and currents into deeper parts of the sea.

8. Snow and ice accumulating in elevated regions, give rise to glaciers, or ice rivers, and there effect glacial denudation, and transport solid materials for indefinite distances over land and sea.

LECTURE V.

1. All denudation, whether pluvial, marine, or glacial, tends to transport the dry land into the depths of the sea, and there deposit it in horizontal beds, or strata. Therefore, given time, denudation must finally reduce all the land to a submarine plain, which will exist for ever, if there be no reparative natural agency competent to produce new dry land.

2. Two such reparative agents exist in nature; the one is plutonic, the other vital. The plutonic agent is the hot inner substance of the earth; the vital agent is protoplasm.

3. The interior of the earth is hotter than the surface, the increase of temperature taking place at the rate of about 1° Fahrenheit for every 50 feet of vertical descent. If the temperature increases regularly at this rate, the heat at a depth of 20 miles must be great enough to melt all substances with which we are acquainted.

4. As a matter of fact, melted rock is being constantly thrown out in many parts of the world, and in enormous quantities, from certain vents, or holes in the crust of of the earth, which are called volcanos.

5. The matters thrown out are steam, volcanic ashes, and stones; mud, and streams of melted rock called lava. The heap of these matters which accumulates round the vent is a volcanic mountain.

6. The same plutonic agent which gives rise to volcanos also effects movements of the crust of the earth, which may raise strata formed by denudation above the sea level, and convert them into a new dry land. On the other hand, it may depress existing strata, and, bringing them within range of the melting point, give rise to a sort of igneous denudation.

7. From these considerations it follows that the solid matter of the globe is undergoing the same eternal circulation as the water of the Thames. The immediate agent of that circulation is in all cases water, in its three forms of ice, water (commonly so called), and steam; the remote agent is heat—firstly, of the sun; secondly, of the interior of the earth.

TECHNICAL EDUCATION IN MIDDLE-CLASS SCHOOLS.

In connection with the remarks made by Lord Henry Lennox, in his opening address as Chairman of the Council (see last *Journal*, page 10), on the Rev. Wm. Rogers' school, the following, which appeared in the *Times* of the 23rd inst., will be read with interest:—

"The Honorary Secretary of the Middle-class Schools Corporation presents his compliments to the Editor of *The Times*, and will feel much obliged by the insertion of the accompanying letter.

"The growing conviction among the most thoughtful of our citizens, as to the national importance of technical education, seems to render any apology for this request unnecessary.

Cowper-street, City-road, E.C., Nov. 22.

"4, Queensberry-place, South Kensington, Nov. 20.

"MY DEAR SIR,—To-day I visited the City of London Middle-class School, and spent several hours in examining the system pursued in it, and the results attained during the short period of its existence. Had I nothing further to express than my thorough gratification with the scheme of the school, I would not trespass on your time; but I am anxious for a still further development, and, therefore, venture to ask your attention to my proposal. The school, if it be properly supported by the citizens of London, may become one of the glories of the metropolis. To make it worthy of the first commercial city in the world, you must develop its resources for teaching science, in its relations to those technical subjects which lie at the foundation of commerce.

"As part of your freehold, I observed some inferior houses, the site of which would be admirable for chemical laboratories and scientific museums in relation to commerce. I should like to see built upon this site a building suited for these purposes, open to the school during the day, and to the working classes in the evening. No boy with such advantages need leave the upper classes of the school, without being able to examine the various kinds of merchandise which he will meet within his occupations, so far, at least, as would enable him to test chemically their relative excellencies or detect their adulterations. No boy need then leave the school without having had his physical and political geography copiously illustrated by objects of natural history, in their relation to the imports and exports upon which the prosperity of the country so largely depends.

"The cost and maintenance of such a building as that indicated, may be estimated at a sum of from £12,000 to £15,000. But what would this sum be to the great London corporations, which, by their recent public meeting, have shown their anxiety to co-operate in the advancement of technical education. Abroad, we see much larger sums spent in the erection of mere chemical laboratories, to advance the industrial education of the people. Berlin and Bonn have recently erected them at the expense of £50,000 each, and Leipsic, I understand, at a cost of about £30,000. The much smaller sum that I have indicated as sufficient for your wants might be subscribed in a single day by such wealthy corporations as the Goldsmiths', Grocers', Mercers', Haberdashers,' Fishmongers', Drapers,' Skinners', Merchant Tailors', Clothworkers', and Salters' Companies, and others with which you must be more familiar than myself. They have expressed themselves zealous and willing, and I am sure could not engage in a more profitable expenditure.

"I am, my dear Sir, yours sincerely,

"LYON PLAYFAIR.

"The Rev. W. Rogers, Hon. Sec., City of London Middle-class School."

CERTIFIED INDUSTRIAL SCHOOLS.

THE CLIFTON CERTIFIED INDUSTRIAL SCHOOL.

BY GEORGE C. T. BARTLEY.

The certified industrial schools occupy a position in the educational system of the country somewhat between the reformatory and the industrial pauper schools. They consist of institutions in which industrial training is provided, and in which children are lodged, clothed, and fed, as well as taught, and which have been certified by the Secretary of State for the Home Department as fit for the reception of children sent to them, under the provisions of the Industrial Schools' Act, 1866.

The management of these institutions is left chiefly in the hands of local committees, under the inspection of an officer, who reports annually to the Secretary of State for the Home Department. This report is published and presented to Parliament. The increase of these schools is going on rapidly, no less than fourteen having been created during 1868, making a total of seventy-seven in England and Scotland, in working order, up to the end of last year.

The children detained in these institutions may be divided into four classes:—

1. Those who are apparently under fourteen years of age, and who have been sent under a warrant from a magistrate, or two justices, on account of—

(*a*) Begging or receiving alms in the streets.

(*b*) Having been found wandering about without proper guardianship or home.

(*c*) Having been found destitute, either as orphans or the children of imprisoned criminals.

(*d*) Having been found in the company of reputed thieves.

2. Those under twelve, who have been charged before a magistrate with an offence punishable by imprisonment or a less punishment, but who have not been convicted of felony.

3. Those apparently under fourteen, who have been

represented before a magistrate, by their parents, as too unruly to control at home.

4. Those apparently under fourteen, who are refractory in the workhouse or the pauper school, or whose parents (one or both) have been convicted of crime, and punished with penal servitude.

In all these cases, a magistrate or two justices has power to send such children, for a certain time, to a certified industrial school, but the period of detention must in no case extend beyond the time when the child attains the age of sixteen years.

The object desired to be attained by these regulations is to remove children from temptation and evil company at an age when they are most susceptible for good, and while habits of industry and usefulness may still be engrafted. As such training is effected better at an early age, and as it is a condition of entrance that the children shall not have been convicted of felony, it is not surprising to find that they are taken in considerably younger than at the reformatory schools. The average ages of 2,488 children were as follows:—

	Per cent.
Under 7 years of age	3·7
Between 7 and 9 years of age	21·0
„ 7 „ 11 „	30·8
„ 11 „ 13 „	33·8
Above 13 „	10·6

Proportion who were illegitimate	3
„ who had lost both parents	12
„ „ „ one parent	40
„ „ „ been wholly deserted ..	11
„ „ „ one or both parents destitute or criminals	3
„ „ „ parents living, and able to take care of them	30

A large number of the inmates being thus received at an early age, and the attendance being compulsory, and subject to no interference on the part of parents or others, it follows that these schools have great advantages over such institutions as the one at Hanwell. In another respect, however, they labour under a disadvantage, and that is from their having so small a number of pupils. At the 69 schools for which the details are published there was, in 1868, an average attendance of 8,659, or at the rate of 125 in each school. This number in itself is too small for a well-organised industrial school; but when the larger institutions are taken away from the calculation, such as the Middlesex School, with 732 pupils; the Kirkdale, 549; and ten others, each having more than 200 pupils, the average attendance at the remaining 59 schools, is reduced to 77. Some, indeed, have as few as 50, 40, 28, 26, 17, and even 8 pupils. The staff of the school with 8 pupils is two, and that with 28 (Shustoke) no less than four. At Leeds, with an average attendance of 221 children, a staff of eight only is required, at a cost, for salaries and rations, of £198 12s. 5d., or 18s. per head. The four officers to look after the 28 boys at Shustoke cost no less than £99 4s. 5d., or over £3 10s. per head.

Nothing shows more clearly the disadvantage of small schools than the varying cost of the officers and their rations, to say nothing of the increased efficiency and advantage of numbers in promoting rapidity of instruction. The cost of officers' pay and rations at the Gem-street school of 77 pupils, amounts to £423 8s. 10d.; whilst at the Somerset school, with 70 pupils, it is only £183 2s. 1d. Numerous cases of a similar description could be pointed out. It would seem that, as the children are not able to be removed when once placed in the school, it would be much cheaper, and far more efficient, to combine these schools into a few very large model institutions. The only additional cost of this would be the travelling of the children on joining—a nominal item in comparison with the present outlay on the numerous petty staffs.

The income of these schools is derived from the following sources:—

(*a*) Treasury allowance.
(*b*) Payments from the parents of some of the children.
(*c*) Payments from the parochial boards on account of children detained on their application.
(*d*) Contributions from rates.
(*e*) Private subscriptions, legacies, &c.
(*f*) Payments from voluntary inmates.
(*g*) Profit on industrial departments.

As regards the first and chief item, viz., the Treasury allowance. By the Industrial Schools' Act, 1866, the Treasury is empowered to contribute such sums as, from time to time, the Secretary of State shall think fit, from sums voted by Parliament, towards the custody and maintenance of children in certified industrial schools. This sum varies. In Scotland it is 4s. 6d., but at Clifton, and at most other places in England, it is fixed at 5s. per head per week.

The parents' contribution in no case can exceed a sum of 5s. per head per week; though it is, as a rule, very much below that sum, and, in many cases, the payment cannot be enforced at all, owing to their inability to pay.

The parochial board's payment, for those children whom it has been instrumental in handing over to the certified school, is a matter of arrangement between that body and the managers, subject to the approval of the Poor-law Board.

The contribution from the rates, from the parish from which the child is received, is a considerable item in the receipts, amounting, at Clifton, and in many other cases, to as much as 1s. per head

The subscriptions, &c., form the largest item next to the Treasury payments, and correspond to the local assistance obtained by most national and other schools.

The profits on the industrial departments amounted, according to last year's report, to no less than £4,830 in the year; but the exact particulars and details are difficult to ascertain with any degree of certainty. The mere fact of there being a decided pecuniary advantage derived from the industrial work is of itself sufficiently satisfactory.

In the case of additional buildings being required, the authority of the Secretary of State has to be obtained in each case, and contributions towards the expense of building, establishing, or acquiring land for such schools, may be made, on certain conditions, from the county and borough rates.

The rules for each school have to be printed and approved by the Secretary of State, and every school has to be inspected annually by the Home Office Inspector. Religious instruction is given, and many of the schools are entirely for Roman Catholic children. In cases where the religious persuasion of a child is different from that of the general school, a minister may visit, at certain times, for the purpose of instructing him in religion, according to any sect to which he may belong.

The licence system is largely in operation in these schools, and its extension is a good sign that the work and training are really sound and effective. By this plan a child, after he or she has served eighteen months in the school, may be sent to live with some trustworthy person who is willing to take charge of him or her. These licences are renewable every three months, and the time thus spent is considered part of the period of detention. By misconduct, the licence may be withdrawn, and absconding from such a situation is considered equal to absconding from the school.

The punishments inflicted for serious offences at these schools are chiefly, for the elder children, short terms of imprisonment, with a sentence of servitude for a term of years at a reformatory school established under the Reformatory Schools Act, 1866.

Such is an outline of the plan of these schools, which

are situated in all parts of England and Scotland. The largest at present established, are as follows:—

	Children.
Middlesex Industrial School, at Feltham	732
Kirkdale School, Liverpool	549
Hull School	478
Glasgow School	446
Liverpool Institute School	330
Glasgow Orphanage	305
Newcastle School	254
Aberdeen School.....	250
Edinburgh School	250
Manchester	226
Liverpool, St. George's Roman Catholic School	225
Leeds School	221

Schools have also been established on the following ships, which have been given up for the purpose of training the boys as sailors:—The *Havannah*, at Cardiff, with 108 pupils; the *Wellesley*, at South Shields, with 46 pupils; the *Southampton*, at Hull, with 17 pupils. The success of this plan of providing old-fashioned ships as schools renders it probable that the number may be considerably increased.

The remaining schools have less than 200 pupils, and the institution situated at Clifton Wood, Bristol, concerning which a few remarks will now be made, contains just 100 boys.

The school premises are situated close to the river at Bristol, in a busy part of the town, and are somewhat cramped for room. They are conducted on the half-time system entirely, and receive children from the city of Bristol and county of Gloucester, together with some from Stafford.

The industrial work pursued is—

1. Tailoring.
2. Shoemaking.
3. Brushmaking.
4. Laundry-work.

In all these branches a considerable profit is made, after deducting the whole cost of material and tools, and likewise the wages of the teacher. Forty boys are employed in the tailoring trade, and they make the whole of the clothes for the school, as also the uniforms for the Volunteer band. The net profit in this branch last year was £96 18s. 5d. In shoemaking, eighteen boys were instructed, and produced boots and shoes for the school, at a profit of £30 2s. 7d., that is to say, had these articles been purchased, they would have cost that sum over and above the outlay on the materials and the wages of the teachers. The brushmaking business is conducted somewhat differently, as, of course, the manufactured articles are of no use to the school. It is the practice for a manufacturer to send the materials, and for the boys to make them into the style of brush required. By this means the school runs no risk, and ample employment is given to the boys, at a remunerative rate. During the year, a sum of £116 9s. 4d. was paid for making brushes, which yielded a profit of £76 2s. to the institution. The laundry is also considered an industrial department, as indeed it is; and since this work has been done by the boys themselves, a large saving has been effected, besides useful work being found for the children. The profit for last year was £29 4s. From this, it appears that the total net profit to the funds of the school accruing from the industrial departments, in the year 1868, was £228 11s. 5d., or considerably over 11 per cent. of the entire cost of the institution.

This great success may be partly accounted for, from the excellent plan of giving the children themselves an interest in their work. In all cases, part of the profit goes to the boy, that is, on the number of articles he has produced; the earnings, therefore, of each are strictly on results. The money thus earned is deposited in the savings-bank, and on the boy leaving, it is given to him to help as a start in life. Several, by this means have accumulated £4 or £5.

Six of the most deserving boys received their freedom on licence during last year; and, up to the present time, the managers report that in only one instance since the licence system was introduced has the privilege been abused.

A drum and fife band has been formed, composed of the children of the school, and its efficiency is so well known that on several occasions urgent requests have been made for the loan of it at fêtes, &c. The managers, however, wisely think that it is hardly advisable to allow the boys to go out for such occasions, when they would be removed from the eye of their officers, and liable to get into mischief. For school purposes, that is, for maintaining the tone and life of the children, as also in assisting in the systematic drill which is carried on, the superintendent considers that, with such children, a band is an essential means of instruction and improvement.

The subjects of education, apart from industrial training, are necessarily elementary, the three "R's" being about all that is expected, the rules of the committee stating that other subjects may be added, as the limited time and capacities of the boys may warrant. In a few cases, when any child shows a superior amount of intelligence, the course may be somewhat extended, though the principal object of the school is the industrial training of the boys, in order to form habits of labour, neatness, order, and general usefulness.

The punishments necessary to maintain discipline are left to the superintendent, though he is required to report them to the committee. During 1868, thirty-six were inflicted, consisting of forfeiture of rewards and privileges, reduction of food, separate confinement, and, for the severest offences, moderate personal correction with a common school rod or cane.

The expenses of the school are rather high, amounting to £2,051 13s. 9d. for the year 1868, or at the rate of £20 10s. per head. It is true that the profits on industrial work reduce this by £2 5s., but still there can be no doubt that even then it is too high. Under the excellent management in which the school now is, it would seem probable that were the size of the school increased the cost would relatively be much reduced. Within a very short distance of this institution there are two others precisely similar, the one at Park-row, for sixty-nine boys, and the other at Cotham-road, for twenty-eight girls, each requiring the expense of a separate staff, rental, &c. This might be much reduced besides being made more efficient, by uniting all three together.

The results of the training on the children in their after life are certainly satisfactory, though the fruits do not seem to be so great as at the large pauper schools of Norwood, &c. This may probably be accounted for from the fact that the average age of the children on entering being greater at Clifton than at Hanwell, they have, unfortunately, in too many cases, had the seeds of crime profitably sown in them by their companions before entering the institution. The number, however, who are permanently rescued from a life of villany is very great, being not less than 80 to 85 per cent. From a return made of those who left this school in the years 1865, 1866, and 1867, it appeared that 31 were doing well; 5 were doubtful; 4 had been committed to prison; 1 to a reformatory; 3 had disappeared; 2 were dead; total 46. Of the five doubtful cases, and the three who had disappeared, the larger number subsequently were found to be doing well, so that really only five of the forty-six were known to have been trained in vain.

In conclusion, it may be affirmed that these certified industrial schools supply a most important want, and that their rapid extension is highly desirable. Were sufficient schools created to contain all the children in the kingdom who come under the first and second categories of those at present in the existing institutions, as explained at the commencement, and were the law not

permissive, *but obligatory*, that all such children should be sent to them, it would seem that a great part of the work sought to be achieved by compulsory education would be accomplished.

Fine Arts.

PICTURE BY RAPHAEL FOR SALE.—A fine work by Raphael, formerly belonging to the Court of Naples, but now in the possession of an ex-ambassador, is said to be now offered for sale at the price of half a million of francs (£20,000.)

OPENING OF THE FINE ART SEASON IN PARIS.—The auction mart of the Rue Drouot is begining to exhibit activity, and a large number of sales are already announced. It is expected that the coming season will be one of great interest, and that the number of pictures and other works of art brought to the hammer will be unusually large.

ACQUISITION TO THE LOUVRE.—One donation almost invariably produces others; the fine collection of the late M. Lacaze has just become the property of the French nation, and now another well-known collector, M. Duclos, is about to present to the famous gallery one huudred of the best pictures in his collection. Already the whole of the new rooms of the Louvre are occupied, and great changes have to be made, to afford space for the Lacaze Gallery; but the completion of the great gallery, and the removal of the Salle des Etats will soon furnish more space, which, however, will soon be filled.

PARIS SCHOOLS OF FINE ART.—The new session has just commenced at the Ecole des Beaux Arts, and the following is the list of students in the various sections:—School of painting, seventy pupils, and ten supplementary, or candidates for admission; sculpture and medal engraving, twenty-seven pupils and supplementary; architecture, thirty-nine pupils. Total, 156 titulary and supplementary students.

Commerce.

COMMERCIAL TREATIES BETWEEN ENGLAND AND FRANCE—The coming revision of the commercial treaties between France and England is beginning to give rise to very active exertions in various parts of the French empire, and there is no doubt that great efforts will be made to obtain an increase of the protective duties, already, in many instances, nearly prohibitive in favour of French manufactures. At present Rouen is prominent in the movement—which, however, commenced in the north and east of France—which has for its object the defence of the interests of all classes of manufacturers, gravely compromised, say the protectionists, by existing treaties. The President of the Chamber of Commerce of Rouen has laid before the members of that body a report, which is considered by the protectionists to prove, beyond all question, that the tariffs must be modified in favour of national productions, and that, if the present system be longer maintained, French industry must infallibly be completely ruined. The report gives, amongst other matter, a comparative statement of the expenses of French, English, and Swiss spinners, the conclusion being that, under the heads of machinery, installation, fuel, interest on capital, and labour, taken together, England has an advantage amounting to $23\frac{8}{10}$ per cent., and Switzerland very nearly the same. We are told that this conclusion is arrived at, "figures in hand," but these are not published, and thus the inference remains, for the world at large, an assertion only. M. Cordier, the author of the report in question, is a protectionist of the old school; he asks for the remission of all the charges which weigh on the introduction of foreign fuel, the diminution of the railway and all other charges which burden industry, and an increase on the import duties on the manufactures of England and Switzerland. The report was, we are assured, received with acclamation by the Chamber. The action of the Chamber of Commerce has been followed by a public meeting, at which about four hundred persons were present, and at which the treaties of commerce were denounced in energetic terms, and amidst shouts of applause. M. Pouyer-Quertier said that, before raising the protective duties, the existing treaties should be entirely abolished as "incompatible with the government of the country by the country itself." He considered that the question of temporary admission of iron and other materials should be considered entirely apart from the general tariff. A committee has been appointed to consider the best means of associating the working classes in the movement, or, in other words, of raising a popular demonstration against the proposed renewal of the treaties by the government. Mr. Ozenne, Conseiller d'Etat, is visiting the factories of Rouen and Roubaix on the part of the government, and the other day he was present at a meeting of the Rouen Chamber of Commerce, where memoirs were presented to him by cotton and flax spinners, and the whole question was discussed at great length. The action of the advocates of increased protection has naturally given rise to a counter-movement in Bordeaux and other places interested in the reduction of the British duties on French products. It is well to mention, in connection with this important subject of import duties, that it is asserted in Paris that the project of a customs' union on the Continent, which was for a time abandoned, has been revived, and is now under serious consideration. It is further asserted that, in addition to France, Belgium, and Holland, the governments originally included in the proposition, Sweden and Denmark are now added. It will be at once seen that such a proposal is very unlikely to have effect, as any exclusive arrangement of the kind would militate against the efforts of the French government to improve its commercial relations with England and Germany. However, during the excitement created by the proceedings of the advocates and opponents of free-trade, all kinds of schemes will, doubtless, be started, and will demand examination.

TEA CULTIVATION IN THE UNITED STATES.—The *Produce Markets Review* says:—We have several times called attention to the suitability of the climate of the Southern States to the cultivation of tea, and if the threatened immigration of large numbers of Chinese takes place, skilled labour might be obtained without great difficulty. American planters must, however, not run away with the idea which nearly ruined our Indian planters at the beginning of their enterprise—that all Chinese understand the growth and preparation of tea. Ordinary Chinese know as much of the subject as the Irish do of the cultivation of the grape; and the labourers, to be of any use, must come from the best tea districts in China, or else they must be Indians from the British plantations in Assam, Cachar, and other parts of India." The same journal quotes from the *American Grocer* to the effect that, in various parts of North Carolina, the tea plant has been cultivated successfully. It also appears that this is the case in South Carolina, though here it is still a matter of experiment.

Colonies.

SUGAR AND OTHER PRODUCTS OF QUEENSLAND.—The cultivation of sugar in this colony is being developed in a highly satisfactory manner, the results from various portions of the colony being reported superior to anticipation. Several cargoes of cane have recently been conveyed from various farms on the river Brisbane to the mills at Cleveland, and it is anticipated that the growers will receive a satisfactory return. The mineral resources of the country are being most encouragingly developed. The

manufacturing element is also beginning to be developed in the colony. A sugar-mill and engine have recently been completed at the foundry of Messrs. Smellie and Company, equal in manufacture, and at a considerably less cost than if it had been procured from England. Coke has also been manufactured in Queensland, which is said to be of better quality than that imported from New South Wales. Maize meal of a superior quality has been manufactured, and, from the samples shown, they deserve praise for fineness of dressing and quality. Owing to the increased demand for this article, two mills have been erected, capable of turning out a large quantity, and the price for the manufactured article and the charge for grinding are very reasonable.

MEAT PRESERVING.—A Melbourne paper says that the satisfactory intelligence received by the last few mails, respecting the disappearance of the prejudice once existing against Australian preserved meat as an article of food, has not only led to the formation of several new companies, but has encouraged manufacturers at present in the field to extend their operations. A company re-commenced operations in June last, since when they have shipped 300 tons of meat in tins, and the whole has met with a ready sale.

Notes.

SIR W. FOTHERGILL COOKE.—Last Friday's *Gazette* contains the official announcement of the honour of knighthood conferred on Mr. W. Fothergill Cooke. We understand that, in the letter in which the Prime Minister announced to the Secretary of State her Majesty's pleasure that this honour should be conferred, Mr. Gladstone stated that it was bestowed in recognition of Mr. Cooke's great and special services in connection with the practical introduction of the electric telegraph.

Correspondence.

A BLOW TO THE ENGLISH LANGUAGE AND SCIENCE.—SIR,—The effect of the Commissioners' Report on Military Education will be disastrous to useful education, unless a stand is made against it. Allow me to quote what the *Times* of the 24th inst. says on the subject:—"The commissioners having decided to accept for admission to the army the scholars actually produced by our great schools, found themselves under the necessity of recognising and prescribing the following subjects of examination:—Mathematics, classics, modern languages, English, experimental sciences, and drawing. These they valued in the proportion of five marks to classics, four to mathematics, four to modern languages, one and a-half to English, one and a-half to science, and one to drawing. We remarked, on a former occasion, that this valuation represented, in point of fact, a compromise between what was desirable and what was to be had. Existing subjects of study were necessarily taken for the proposed examinations, but their relative places were shifted. The commissioners put mathematics first, Latin second, Greek third, French and German on a level with Greek; below them, on a level with each other, natural science and English, and drawing last. In the actual course of our schools, these subjects would be ranged rather in the succession following—Greek, Latin, mathematics, French, and German. Science, we suspect, would hardly find a substantial place at all, nor drawing either; while, as to English language and literature, they would be picked up principally by studies more or less voluntary. It follows, therefore, that the actual course of our school education is far from satisfying what the commissioners consider to be the requirements of the military profession, and what we wish now to ask is whether there is any other profession which would have better reason to be satisfied. Taking the average stamp of proficiency, we may say that the strongest point of a good scholar from one of our great schools would be his Greek. It is unquestionable that he would know more of classics than of any other subject, and almost certain that he would know more Greek than Latin. In short, the best of his time would have been spent upon Greek, to the necessary prejudice of other studies. What, let us ask, is the profession or occupation for which this is the most suitable preparation? In what position of life is the man to be placed whose interest it will be to know Greek, not only better than any modern language, but better even than Latin? Of Latin it may be said, and appears, indeed, now to be felt, that it cannot be excluded from any scheme of education professing to be liberal; but can as much be said of Greek? Of course, an acquaintance with Greek may be held indispensable to a consummate knowledge of Latin, but of such advanced acquirements we are not now speaking. As much Latin scholarship as would suffice for the needs of even a learned profession, might be acquired without any recourse to Greek, and Greek, otherwise, leads to nothing at all. Take next, the case of modern languages. Of these, English is certainly one, and, surely, not the least valuable to an Englishman; but the commissioners have been compelled to depress it below the languages of the Continent, and to act as if a knowledge of German were not merely desirable in itself, but more desirable than that of the mother tongue. Can that be right? Is there any station of life in which a command of English would not be more useful than a command of German or French? Be it observed, too, that at this point another element of incalculable importance enters into the question. It is through and by the mother tongue exclusively that the arts of written communication are learnt and practised, and we know of no acquirements more precious. How many men in a hundred can write a good letter—a letter telling concisely, lucidly, and easily, what requires to be told, and neither more nor less? Yet, of all the needs of every-day life, such a faculty of writing is about the most imperative. An official report or description is nothing but a letter elaborated; in fact, a man who can write one can write the other. If composition be a beneficial exercise, can it take any better form than this? Again, the value placed by the commissioners on mathematics, has, of course, a reference to the intended profession of the candidate, and elementary mathematics, to say the least, would be exceedingly valuable to an officer. But what shall we say of arithmetic in its more practical forms, such as book-keeping and other commercial or pecuniary calculations? To illustrate the difference between the two studies, let us take examples from daily life. The financial transactions of late years have called into existence a class of "experts," with knowledge almost exclusively its own. When some enormous concern goes into liquidation, with liabilities of a million or two, the books are too mysterious for any scrutiny but that of a professional "accountant," who is accordingly called in. Now, is it to be supposed that these keen and comprehensive calculators, whose eyes no figures can either escape or deceive, are also mathematicians? We think it probable that the referees, whose names appear constantly in our columns, never heard of trigonometry or conic sections, while, on the other hand, we have good reason to know that a proficient in geometry and algebra may be utterly incompetent to understand a balance-sheet, analyse a prospectus, or sift the figures of a common railway report. Is not the practical arithmetic available for such purposes an "exact science," at least as useful as mathematics? Our object in these remarks is to suggest to those intrusted with the conduct of education a revision of the studies it now includes. We have seen that the scholar, as at present turned out from the best of our schools, is not such as the military authorities would have him if they

could get their own way. Is he such as any other authorities would have him? Is it conceivable, for instance, that a man in after life should be so situated as to find his account in having spent the best days of his youth upon Greek plays? As far as the working professions are concerned, would not a knowledge of Hindostanee, Arabic, even Chinese, be more probably useful than a knowledge of Greek. Be it remembered that the Eastern half of our empire contains 200 millions of people, all in our charge. We have described the successful scholar of the present time. He is an excellent Grecian, not so good a Latinist, and possesses, perhaps, but an imperfect acquaintance with any modern language. If he is a good mathematician, he is probably nothing else, and his mathematics may not include the practical arithmetic of every-day life. Suppose, instead of this, the model scholar of ten years hence were to be a thorough master of English, tolerably well acquainted with Latin, able to converse in French, and competent to apply the principles of arithmetical calculation, on any scale, to questions of finance—would he not thus be more perfectly as well as usefully accomplished than the scholar of the present day? If this question be answered in the affirmative, our schools have the matter in their own hands." The Society of Arts, with its numerous examinations, may very properly memorialise the Secretary at War on the subject, and put in claims for English, science, and common sense.—Yours, &c., JOHN LOCKE MILTON.

MEETINGS FOR THE ENSUING WEEK.

MON.....Social Science Assoc., 8. Adjourned discussion on Mr. G. W Hastings' paper, "Review of the Discussion at the Bristol Congress on the Relations between England and the Colonies."
British Architects, 8.
Medical, 8.
Asiatic, 3.
London Inst., 4.
Actuaries, 7. Mr. Bumsted, translation of a paper by Herr Hopf, entitled, "Suggestions for a Law to regulate the Calculation and Investment of the Reserve in Life Assurance Companies."
TUES ...Civil Engineers, 8. 1. Renewed discussion upon Mr. Gaudard's paper, "On the Strength and Resistance of Materials." 2. Mr. Edward Dobson, "On the Public Works of the Province of Canterbury, New Zealand."
Anthropological, 8.
WED ...Society of Arts, 8. Mr. Zerah Colburn, "On an Improved Means for Laying a Tunnel for the Transit of Passengers across the Channel."
Pharmaceutical, 8.
Obstetrical, 8.
THUR ...Antiquaries, 8½.
Linnæan, 8.
Chemical, 8.
London Inst., 7½.
FRI .....Geologists' Assoc., 8.
Philological, 8½.
Archæological Inst., 4.

Patents.

From Commissioners of Patents' Journal, November 19.

GRANTS OF PROVISIONAL PROTECTION.

Boots and shoes—3228—C. Mole.
Bottles, securing corks in—3220—J. V. Michaux.
Brushes, machines for manufacturing—3077—C. E. Fuller.
Caoutchouc, &c., treating—3254—J. H. Johnson.
Casks, &c., withdrawing liquids from—3252—G. Simpson & L. Strauss.
Electricity and means of telegraphing—3147—E. H. C. Monckton.
Filters and filtering apparatus—3081—C. A. Ofverberg.
Fire-arms, breech-loading—3258—H. Rochatte.
Furnaces and crucibles for melting steel, &c.—3206—J. M. Stanley.
Horse gear—3246—M. Tuthill.
Human excrements, converting into manure—2623—F. Wicke, J. Brönner, T. Petersen, and J. G. Zehfuss.
Kilns for burning limestone, &c.—3244—H. Robinson.
Locks and latches—3256—W. Harris.
Malt, &c., brewing—3248—J. McCormick.
Metallic ores, &c., treating—3204—C. Crockford.
Motive-power engines—3212—R. Douglas and L. Grant.
Packing, &c , materials for—3107—T. Briggs.
Paper waste, treatment and application of—3163—J. Dewar.
Retorts—3224—A. C. Kirk.
Rock-boring machines, stand or carriage for—3240—F. B. Dœring.
Roofs, &c.—3234—J. Riley.
Safety lamps—3232—E. Thomas.
Sewing machine needles—3208—W. R. Lake.
Textile fabrics, ornamenting—3242—J. Logan and W. Gardner.
Umbrellas, &c., sticks for—3230—J. and H. Tracy.
Velocipedes—3214—H. Livesey.
Water-closets—3238—J. Ingleton.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

Combination locks—3250—W. R. Lake.
Horses, &c., apparatus for clipping—3296—H. A. Bonneville.
Submarine telegraph cables—3236—F. Jenkin.

PATENTS SEALED.

1570. S. Jackson.
1578. C. J. Foster.
1580. J. Hudson and C. Catlow.
1585. E. T. Hughes.
1594. B. F. Weatherdon.
1596. M. H. de Goësbriand.
1598. G. Salt and W. Inglis.
1599. A. Barclay.
1602. J. Dick.
1609. L. Roman.
1697. J. Fletcher.
1806. J. Hill.
2364. W. E. Newton.
2440. H. Pinkus.
2486. W. R. Lake.

From Commissioners of Patents' Journal, November 23.

PATENTS SEALED.

1592. W. Furness.
1593. W. Mitchell.
1608. A. McNeile and J. Slater.
1614. H. D. McMaster and A. Dale.
1615. T. Vaughan & E. Watteeu.
1619. C. F. Chew.
1621. C. Hanson & J. Bottomley.
1624. G. H. Ellis.
1632. F. A. Barrow.
1636. T. Bradford.
1639. B. T. Newnham.
1653. J. Frazer and L. and R. Simon.
1672. B. Littler.
1685. F. A. Calvert.
1781. H. W. Hammond.
1798. W. A. Gilbee.
1813. C. Mather.
1807. R. Duckworth, W. Greenwood, J. Pearson, and J. Langtree.
1851. R. Hornsby and J. E. Phillips.
1852. R. Hornsby and J. E. Phillips.
1957. W. R. Lake.
2015. G. Palmer.
2289. H. S. Heyman.
2342. W. Brown.
2547. W. R. Lake.
2556. J. Holdsworth.
2666. S. Simpson.
2719. N. J. Dor.
2807. G. T. Bousfield.
2819. J. Buchanan.
2894. J. Clayton.
2948. J. H. W. Biggs.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

2990. W. R. Lake.
2995. J. Nichols.
3016. J. Bolvin.
3033. J. H. A. Gruson.
3034. T. Greenwood.
3035. J. H. A. Gruson.
3040. W. Chambers.
2990. W. R. Lake.
3036. W. A. Gibbs.
3048. J. Robertson.
3050. J. Howard and E. T. Bousfield.
3062. J. Barker.
3063. P. Gledhill.
3327. W. R. Lake.
3079. W. H. P. Gore & R. Green.
3129. H. Timmins.
3145. W. Brookes.
3341. W. Gilbey.
3060. E. Morewood.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

3113. G. A. Buchholz.
3124. W. Bottomley.
3127. J. Townsend.

Registered Designs.

5055—Sept. 21—The revolving whistle and mouth-piece—L. P. Noble Albany-road, Camberwell.
5056—Sept. 24—Shoulder sustainer—George Gibbs, Birmingham.
5057—Sept. 28—A shield or guard for the nipples of feeding tubes—Maw and Son, Aldersgate-street, E.C.
5058—Oct. 4—Kitchen boiler top—W. Lees and Co., Manchester.
5059—Oct. 8—Combined hot-air and gill stove—Kennard and Ferguson, Glasgow.
5060—Oct. 11—Fastening for the lids of charcoal box irons—W. Cross, West Bromwich.
5061—Oct. 13—Improved hat brush, to be carried inside a hat—T. Higgins, Warrington-gardens, W.
5062—Oct. 14—Sprinkler scent bottle—C. Asprey, New Bond-street, W.
5063—Oct. 14—Sash fastener—T. Pemberton and Sons, Birmingham.
5064—Oct. 21—A board for a new game, entitled "Collision"—R. Hall, Crystal Palace, S.E.
5065—Oct. 21—Excelsior case for bottles—A. G. Avenell, Cambridge heath-road.
5066—Oct. 22—Hay and corn rack for sheep—Southwell, Adams, and Woodroff, Staffordshire.
5067—Oct. 26—Window fastener—W. Lea and Co., Wolverhampton.
5068—Oct. 28—Stanley's improved saddle tree—Stanley and Robinson, 22, Carlton-road, W.
5069—Oct. 30—A rounding machine for saddlery and harness work—W. S. Doulton and Co., Norwich.
5070—Oct. 30—Combined water-pot and garden syringe—W. S. Doulton and Co., Norwich.
5071—Nov. 12—A hand drill—Walker, Brothers, Sheffield.
5072—Nov. 13—Improved circulator for washing purposes—J. Hammond, Bognor, Sussex.
5073—Nov. 20—Jackson's self-acting chimney terminal—Wycliff terrace, Lavender-hill, Wandsworth-road, S.W.